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VERSITY OF ILLINOIS BULLETIN

College and University Airport Management

AERONAUTICS BULLETIN NUMBER 16

UNIVERSITY OF ILLINOIS INSTITUTE OF AVIATION

Leslie A. Bryan, Ph.D., LL.B., Director *James M. Hancock, A.B., Editor*

UNIVERSITY OF ILLINOIS BULLETIN

Volume 52, Number 65; May, 1955. Published seven times each month by the University of Illinois. Entered as second-class matter December 11, 1912, at the post office at Urbana, Illinois, under the Act of August 24, 1912. Office of Publication, 207 Administration Building, Urbana, Illinois.

by

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Director, Institute of Aviation
University of Illinois

COLLEGE AND UNIVERSITY AIRPORT MANAGEMENT

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UNIVERSITY OF ILLINOIS

PUBLISHED BY THE UNIVERSITY OF ILLINOIS, URBANA 1955

FOREWORD

The University of Illinois has been actively interested in aviation for a long period of time dating at least from World War I. During World War II that interest increased and culminated in the establishment of the Institute of Aviation in 1945 which, among its various activities, conducts aeronautical research, flight training, and subprofessional technical aviation courses for students of the University.

The Link Foundation, recognizing the pioneering experience of the Institute of Aviation, provided a grant to the University of Illinois Foundation for use by the Institute in order to prepare and publish information about its program, believing that the compilation of this information might be valuable to other institutions and to other segments of the aviation industry considering the establishment of similar activities.

This bulletin, the final publication of the series, attempts to give the basic information necessary for the organization and operation of a college or university airport. Other bulletins published under The Link Foundation grant cover the organization of a college-level aircraft and engine maintenance curriculum, the operation of a flight training program, the organization of an aviation ground school, and the organization of an aircraft maintenance and repair unit. While the aim has been to provide general information, there is frequent reference to the aviation program of the University of Illinois for illustrative purposes.

In the preparation of the material for this bulletin, Mr. Nelwin C. Grimm, Supervising Engineer of the University of Illinois Airport, has been most helpful.

In this monograph, as in all publications of the Institute, the author has had complete freedom to express his opinions, with the understanding that he will assume sole responsibility therefor.

LESLIE A. BRYAN, *Director*

March, 1955

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The 3½-Million Dollar, 771-Acre University of Illinois Airport

Collegiate Airports

Operation of airports by institutions of higher learning in the United States is not new. The conclusion of World War II, however, gave added impetus to the entire aviation-education movement, with the result that a number of collegiate institutions acquired airfields of their own. Such an institution is the University of Illinois, which, with the cooperation of the federal and state governments, has become the owner-operator of a large 771-acre airport with three concrete runways each 5300 feet in length, plus necessary taxiways and ramp space. The purpose of the Airport, as announced at its dedication, is "to implement a comprehensive program of aviation education and research and to provide commercial and private landing facilities for the promotion of American air transport and national defense."

Because of its utility and capacity the University of Illinois Airport acts as the municipal airport of the community, thus adding income to the Airport's balance sheet. Most university airports need not be as large nor as expensive to build and operate as that of the University of Illinois. The University of Illinois Airport is operated as a public airport. During the past few years the development of the monodirectional runway concept and the mechanical improvement of aircraft have lowered airport land and facility requirements.

Contrasting with the University of Illinois type of airport operation are three other forms which may better suit a given circumstance. The first plan — used by Stephens College of Columbia, Missouri — requires the renting of space at the municipal airport for the operation of the airplane fleet. Through the exclusive use of a rented hangar and shop facilities, the flight program can be inexpensively and efficiently implemented. This plan takes advantage of a functioning airport, with a weather bureau and other facilities found on a feeder-line type of airport.

The second plan is typified by Ohio State University operations. The University owns and operates a small field primarily for its own use. This operation would require a larger initial investment and possibly greater current operating costs. It does provide, however, more flexibility of operation. Such an airport may vary in size from 80 acres upwards. It is similar to the Illinois plan of operation except that the Ohio State Airport is not operated as a public airport.

A third form might be the most effective for a university desiring to start an aviation program on its own airport. Using this plan, a university would provide the land and perhaps other facilities and equipment and would then contract with a qualified flight instructor who would double as the airport manager.

Soon after starting an airport some form of shop and office space will become necessary. Shops and offices may be combined with the hangar space required for aircraft or they may be in separate buildings. Use of corner space in the typical commercial prefabricated T-hangar frequently is advisable for shop or office space; the income from the hangars, therefore, will carry the cost of the hangar including the office and shop space. T-hangar costs range from $500 to $1500 a plane.

The Institute's Executive Committee Planning for the Future

Planning the Airport

The federal government and most state governments extend varying amounts of planning aid to those interested in developing an airport. From time to time financial aid is available also. The Civil Aeronautics Administration, Washington 25, D. C., publishes information on airport planning. A complete list of C.A.A. publications of interest to those planning airports can be obtained from them. The Washington office will also provide the name and address of the nearest C.A.A. Airport Engineer, who frequently can give advice and help in the planning stage. Most state departments of aeronautics also are staffed to give at least some general engineering and planning aid. The references in the Appendix will be helpful in planning the airport and its operation.

The Airport Manager

In even the smallest airport operation an airport manager or his equivalent is required. Some or all of the following duties and responsibilities will be required of him:

1. Planning and directing airport maintenance and operation, i.e., maintenance of runways, taxi strips, aprons, field area, fencing, lighting, roads, parking lots, hangars, administration buildings, and equipment
2. Supervision of the planning and direction of improvements and future expansion
3. Maintenance of pleasant and orderly working relationships with tenants and patrons
4. Operation of the airport in accordance with sound business practices
5. Understanding and appreciation of the purpose and functions of the airport, and of how these can best be achieved
6. Familiarity with airport operation, safety requirements, and various state and federal regulations pertaining to aviation
7. Arrangement and maintenance of proper coordination and cooperation among the various interests using the airport
8. Responsibility for the over-all management of the airport
9. Direction of the activities of all other airport employees
10. Supervision of all administrative functions of the airport such as the gaining of income through the medium of direct revenue from airline companies, fixed-base operations, concessions, and similar activities

11. Supervision of the negotiations of contracts with operators and concessionaires

The prevailing salary range at most airports requiring full-time managers runs from $5000-$9000 annually, and in some instances the manager's services are given in exchange for airport-operating privileges.

Airport Budgets

Airport budgets are normally set up on an annual basis. As a planning tool and as a guide for expenditures, the airport budget is an important management control. For college airports the budget may be (1) a disbursement budget based on an appropriated amount, (2) an income and expense budget, (3) or a combination of the two types.

The major items of an operating budget include:

1. Salaries
2. Motor fuel, oil, and maintenance of service vehicles
3. Electricity for light and power
4. Water, gas, fuel oil, and such items used in buildings
5. Telephones, special lines, teletype, and other means of communications
6. Normal maintenance of existing facilities
7. Improvement of, or additions to, existing facilities
8. Provision for machinery and equipment upkeep
9. Additions to machinery, equipment, and facilities
10. Fire protection
11. Insurance
12. Taxes
13. Miscellaneous fixed charges, depreciation, and other similar items

Airport Accounting

Airport accounting is accounting applied to the specialized field of airport operation. The axiom that every business requires an efficient accounting system as a method of controlling its financial affairs is equally true of airport operations. Satisfactory systems for an airport may be established by any reputable firm of accountants specializing in airport accounting, or the standard airport accounting procedures suggested by the Civil Aeronautics Administration may be used.

Airport accounts are kept for the following purposes:

1. To locate and aid in preventing wasteful or inefficient operating practices
2. To determine, control, and reduce the costs of operation

Air-Agers Inspect Airport Operations

3. To discover and assist in eliminating unprofitable operations
4. To provide performance records
5. To assist in financing and credit
6. To provide cost knowledge on which to base charges
7. To estimate prospective traffic and revenues
8. To keep management informed with respect to the financial condition of the operation
9. To furnish a basis for necessary reports

A typical system consists of two main features — the Chart of Accounts and the Financial Statement.

The Chart of Accounts has been designed to provide a method for keeping all of the accounts ordinarily required for the proper recording of transactions and for the development of information needed to permit a detailed analysis of the business. The requirements peculiar to the individual business have been considered by allotting sufficient unused ac-

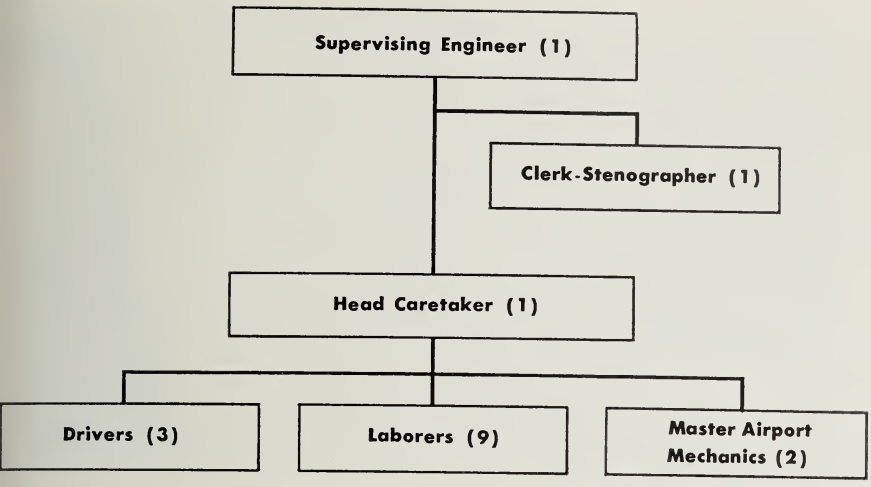
count numbers in each group to permit expansion by adding needed accounts.

The Financial Statement consists of the following four sections:

1. The Balance Sheet is the conventional type with recognition given to the assets and liabilities peculiar to fixed-base operations.
2. The Profit and Loss, or Operating Statement discloses sales, cost of sales, gross profit, expense, and operating profit for the business as a whole and for the following departments: new aircraft, flight, service, parts and accessories, and line operations. Spaces are provided for two additional departments, such as restaurant and recreation facilities, whether operated by the business or rented as a concession. Miscellaneous earnings, deductions from income, provision for income taxes, and the final net profit are not allocated to departments but are shown for the entire operation.
3. The Analysis of Expense lists the amount of each kind of expense in total. Each expense account can be allocated to the department responsible or can be prorated to the various departments.
4. The Analysis of Sales, Cost of Sales, and Gross Profit show the total amount of each of these items for the period, with subtotals for each item shown for each department. A column is provided to show the percentage of gross profit for each class of sale.

Field Maintenance

The foregoing discussions have been largely of a general nature. The following discussion has to do more specifically with the organization and operation of a field maintenance department, or its equivalent, for the airport. A field maintenance department is primarily responsible for the physical upkeep of the airport, and the maintenance and operation of the plant and equipment. The general principles of business administration are as applicable to an airport operation as to any other type of business. As the airport and its activities grow larger, the organization and personnel can be expanded. The personnel required for maintenance will vary, depending upon the size of the airport and the extent to which the college or university may have responsibility for the airport's maintenance and operation. Possibly the only maintenance necessary will be part-time janitorial help or contract mowing. On the other hand, a fairly large crew is needed to provide the maintenance functions necessary for as large an operation as that of the University of Illinois Airport. With a small airport and a small amount of aviation activity, the needed functions and personnel can be adapted from the following descriptions of the Institute of Aviation field maintenance organization. The organization chart is as follows:



Staff Flexibility

Flexibility is one of the important needs of a maintenance crew. This is best obtained by the development of a group of above-average laborers who, over a period of time, can be taught the fundamentals of painting, metal work, machine operation, etc., on the job. By Illinois state law it is mandatory to pay workers at the pay scale for the job in which they may be working, so no objection is raised by the laborers of the University Airport staff either to learning or doing other than conventional labor work. It is a definite advantage also to the University, since no time is lost in getting personnel for jobs outside the scope of general labor, and seasonal and peak demands are met more easily. At the University of Illinois Airport the laborers work also as watchmen and janitors as needed. The general rules under which the maintenance department works are reproduced in appendix B.

Supervising Engineer

The supervising engineer acts as head of the field maintenance activities and functions as a consultant to the Director of the Institute of Aviation, who manages the Airport, and to the supervisory staff of the other departments on problems of airport design, construction, maintenance, training aids, safety, general service, and miscellaneous problems.

The minimum acceptable job qualifications are a university degree in civil, structural, or architectural engineering; three years of experience in structural design and supervision of construction, of which at least two years must have been as supervisor in charge of design; a thorough knowledge of design of buildings and structures; a knowledge of the prevailing

Field Maintenance Personnel Repair the Ramp

building code as it applies to structural design; supervisory ability, thoroughness, and accuracy; and a minimum age of 26. The salary range for this position is $6000-$9000 annually.

Head Caretaker

The head caretaker lives on the Airport and is available for emergency calls. He also acts as a supervisor of the field maintenance work crew and as assistant to the supervising engineer.

The minimum acceptable job qualifications are high school education, although some college work is preferred; extensive experience in general construction and in ground care; ability to handle men; good physical condition; good judgment; and a minimum age of 30. The annual salary range for this position is $4000-$6000 plus housing.

Clerk-Stenographer

Under the direction of the supervising engineer, the clerk-stenographer is responsible for varied and complex clerical work involving the exercise of independent judgment. A clerk-stenographer may supervise and direct the work of a small or moderate-sized clerical unit; take and transcribe dictation; compile data for reports; code, classify, file, and direct the filing of all materials in the filing system; give out information as approved by the supervisor; answer routine inquiries; assist in the preparation and maintenance of records, including tabulations and the posting

of data in various record books; control admission of visitors; operate office machines as required and instruct others in the operation of such machines; prepare materials for mailing; handle cash and other valuables; keep expenditures and income accounts, which may include the auditing, vouchering, and scheduling of invoices, payrolls, and expense accounts; and perform related duties as assigned.

The clerk-stenographer should be a high-school graduate with business training, and should have clerical and stenographic ability as well as one year of experience in stenographic and clerical work.

Monthly salaries for clerk-stenographers range from $175 upwards.

Master Airport Mechanics

Under direction, the master airport mechanics perform duties requiring a high degree of skill in construction, building, facility repair, general repair, construction of training aids and specialties, cabinet work, supervision of miscellaneous custodial repair work, and related duties as assigned. They also fulfill duties requiring a high degree of skill in the servicing and repairing of airport machinery and equipment.

The minimum acceptable job qualifications are a grade-school education, although high-school work is preferred; at least five years of full-time experience in carpentry, cabinet work, general construction, building repair, and general repair work; good physical condition; good judgment, responsibleness, and foreman abilities; and a minimum age of 25. Salaries for master airport mechanics range from $4000-$6000 annually.

Laborers — Class A

Under supervision, Class A laborers perform physical labor on construction and maintenance work with sufficient skill and experience to assist the mechanics in the skilled trades; perform semi-skilled labor in building construction, in shops and in buildings; move heavy equipment; mix, place, and puddle concrete; mix mortar; erect scaffolding; rig staging; and perform related labor.

The minimum acceptable job qualifications are a grade-school graduation or its equivalent; the ability to work outdoors under adverse weather conditions; a working knowledge of the tools and the equipment of the skilled trades; a semi-skilled mechanical aptitude in order to assist mechanics in the execution of their work; minimum age of 21. Current wages for Class A laborers at the University Airport is $2.30 per hour.

Laborers — Class B

Class B laborers, under supervision, perform physical labor in construction and maintenance work and have sufficient skill and experience to assist the mechanics in the skilled trades. They perform unskilled labor in building construction, in shops and in buildings; move heavy equipment; mix, place, and puddle concrete; mix mortar; erect scaffolding; rig staging; and perform related labor.

The minimum acceptable job qualifications are a grade-school graduation or its equivalent; the ability to work outdoors under adverse weather conditions; a working knowledge of the tools and the equipment of the skilled trades; sufficient mechanical aptitude to assist mechanics in the execution of their work; dependability and willingness to work as directed; and a minimum age of 21. Current wages at the University Airport for Class B laborers is $2.15 per hour.

Drivers

Drivers operate automobiles, trucks, or buses. They load, haul, and deliver supplies and equipment, mail, freight, and express, maintain and perform minor repair work on vehicles, and perform related duties as assigned. These employees have no supervisory duties.

The minimum acceptable job qualifications are a grade-school education or its equivalent; a state driver's and/or chauffeur's license; ability to pass the University driver's examination; thorough knowledge of state laws governing the operation of motor vehicles on state highways; good physical condition; skill in operating motor vehicles; alertness and dependability; minimum age of 21. Hourly wages for drivers at the University Airport is $2.10.

Equipment

The field maintenance department has the responsibility for maintaining and operating most of the equipment used by the airport. There are some exceptions; for example, a small fire truck which may be operated by the linemen. In other instances, a department such as the aircraft maintenance department may be in operation and therefore may more economically maintain its own equipment.

The total amount of equipment will be determined by the size of the airport, the availability of surplus supplies, the money available, the degree of maintenance attempted, and other factors. Equipment can be acquired gradually. Appendix C shows the approximate cost, amount needed, and the items needed for university airport field maintenance.

Appendix A — Sample Bus Driving Schedule

DRIVER TIME SCHEDULE

7:00 A.M. - 6:30 P.M. Monday - Friday
7:00 A.M. - 1:00 P.M. Saturday
No Sunday Driving

	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
SHOTT	x	(8½)	(8)	x	x	x	x	x	(8)	(8)	(8)	(8)	(8)	x	x	11½	11½	11½	11½	11½	6
SCHROEDER	x	11½	11½	11½	11½	11½	6	x	(8½)	(8)	x	x	x	x	x	(8)	(8)	(8)	(8)	(8)	x
SHIPLEY	x	(8)	(8)	(8)	(8)	(8)	x	x	11½	11½	11½	11½	11½	6	x	(8½)	(8)	x	x	x	x

Drivers will be responsible for the following items of maintenance:

1. Filling bus with gasoline each day so that tank is full for next day's run
2. Checking oil and refilling if necessary
3. Washing windshields and window glass
4. Sweeping out bus each day
5. Checking tires, lights, horn, and signals

x — Days off

(8) — Circled figures — work with Field Maintenance Crew

Appendix B — Field Maintenance Rules and Regulations

The following rules and regulations are currently in effect in the field maintenance department of the University of Illinois Airport. Many of the rules and regulations are equally applicable to other departments of the Airport. As such they are a part of the University Airport procedure manual. They are included here to help complete the picture in the hope that they might be of assistance in establishing and developing a university or college airport.

I. Administrative Procedures

A. Governing Body — All rules and policies of the University of Illinois, the Nonacademic Personnel Office, and the Office of the Director of the Institute of Aviation shall apply to the field maintenance department.

B. Absences

1. Any employee who is unable to report for work because of illness or other causes must send word or call his supervisor's office before 8:30 a.m., if possible, or within one-half hour after his regular reporting time. Further inability to be available for work must be reported not later than 5:00 p.m. of the first day of absence.
2. Absence for other causes must have prior approval of the employee's supervisor or such absence will be "absence without leave."

C. Courtesy — Courtesy is required of all personnel of the Institute of Aviation when working or conducting business with the public, employees of other University departments, or other Airport employees.

D. Grievances — Grievances can be of extreme importance in the morale of any working group. The field maintenance department employees are encouraged to "talk out" problems with their supervisor. Forms for the reporting of grievances are available to all personnel at the field maintenance office.

E. Holidays and Vacations

1. There are six University-recognized holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day.
2. Staff members will not take vacations or time from regular work without prior approval.

3. Each supervisor should send a copy of his department's vacation list to the director's office as soon as such schedule has been established.

F. Personnel Records

1. A personnel record is kept for each employee; this form is placed in the employee's file and entries made as needed.
2. Changes in status, i.e., resignations or changes in salary, should be reported on the Request for Change of Status Form and submitted to the director's office, with one copy for his file and the other copy to be forwarded to the Office of Nonacademic Personnel. A carbon copy is added to the personnel file of the employee concerned.
3. Any full-time employee who desires to resign must go to the Office of Nonacademic Personnel to sign necessary forms required by that office.

G. Solicitors, Salesmen, etc.

1. Solicitors will not be allowed to approach any personnel unless authorized by the office of the director or by the supervisory personnel.
2. Commitments for purchase of any material shall not be made by any employee unless authorized by the proper University authorities.
3. Cooperation by all personnel in authorized fund-raising drives is encouraged, but contributions are a personal decision of the employee.

II. Operational Procedures

A. Appearance and Cleanliness of Department Areas

1. Field maintenance department personnel are encouraged to improve and maintain a neat and sanitary appearance in and about all areas, buildings, and facilities of the department.
2. Regular or unscheduled clean-ups shall be performed as often as necessary to maintain the neat appearance of all facilities.
3. Particular attention shall be paid to the field maintenance locker room and to the rest room in the field maintenance garage.

B. Employee Parking Area

1. Field maintenance department personnel will use the parking area provided at the field maintenance garage.

2. Automobiles shall not be parked on the concrete ramp or on the ramp adjoining the T-hangars; nor in areas reserved for maintenance vehicles and maintenance equipment, or in driveways, areaways, garages, or across roads in a manner that will block through traffic.

C. Fire Protection

1. Responsibility for immediate report and action on a fire rests with the individual(s) and department discovering the fire.
2. Fire-fighting equipment is located as follows:
   a. Jeep fire and chemical truck is available and ready on the flight line.
   b. Crash truck with water is available at the field maintenance garage.
   c. Fire extinguishers are available in the main hangar, shops and quonsets.
3. All personnel shall be available for assistance on any fire.
4. The field maintenance department is responsible for all maintenance of fire-fighting equipment.
5. The supervising engineer has the responsibility for the direction of fire fighting and fire prevention.

D. No Smoking Regulations

1. Because of insurance, fire, C.A.A., and National Safety Council regulations NO SMOKING will be permitted in the shops, aircraft storage areas, or T-hangars or within 25 feet of the main hangar doors, gasoline storage tanks, any parked airplane, or any area where aircraft dope and thinners are stored.
2. Smoking is not permitted in the classroom while class is in session.
3. Smoking is permitted in the private offices on the campus and in various airport offices.
4. Women employees of the Institute are not permitted to smoke while on duty. Women employees will be permitted two 15-minute breaks a day, during which time they may smoke, run errands, have coffee, etc. The morning and afternoon 15-minute break is subject to the rules outlined by the Office of Nonacademic Personnel.

5. Violations will be reported to University authorities with a request for the immediate suspension and permanent release of violators.

E. Safety

1. First-aid kits are provided in the offices, shops, garage, quonsets, and certain airport vehicles. Please attend to all cuts or scratches immediately and report all such accidents.
2. National Safety Council rules shall be in force throughout the University Airport operations.
3. Machinery requiring safety guards of a particular type shall not be used unless such guards are properly installed.
4. Goggles are to be worn by all employees when using grinding wheels, wood sanders, or when doing lathe work, metal sawing, or welding.
5. Inhalators are to be used when spraying lacquers, dopes, or large areas of paint.
6. Rubber gloves are to be worn when harsh cleaners are used.
7. Students are liable for their own accidents; however, staff members will supervise the testing of all engines, the operation of machinery, the moving of equipment, and the operation of instructional equipment.

F. Telephone Operation and Courtesy

Impressions made over the telephone are very important. In both business and social life voices over the wire should be as pleasant as possible; they reflect real personalities. The business phone is for business, however, and personal calls should be kept to a minimum.

1. When receiving a call

   Answer the telephone promptly.

   Greet the caller pleasantly.

   Identify yourself; for example, "Institute of Aviation, Miss Smith" or "Operations Office, Mrs. Jones"; or if answering a telephone which has first been answered by someone else, simply say "Mr. Brown" or "This is Mr. Brown."

   Explain waits. When the desk is left to get information, inform the caller of this fact and offer to call him. If he waits, make some introductory remark to get his attention when returning, then give him the information.

2. When answering calls for others

   Ask questions tactfully and only those that are necessary, such as name and telephone number. Use such phrases as "May I tell him who is calling?" or "When Mr. Smith returns may I tell him who called?"

   Note the name of the person who called, his telephone number, the time, and if he wants the call returned. Write the message down; do not rely upon memory.

   If the person being called is not available, explain that he is in a meeting or conference or out of the city — not that "He's busy" or "He's tied up" or "He isn't here." If he is out of town, explain when he will return and ask if a message may be taken or if anyone else can answer the question.

3. When placing a call

   Be sure of the number.

   Be ready to talk when the called person answers.

   Allow time to answer.

   If the person in charge of the business you are calling about is not known, give the operator a general idea of your business so she can connect you with the proper office.

4. When transferring a call

   Hold the call until the new connection has been made (whether it is to another number or to an extension).

   Signal the operator slowly when transferring a call.

5. When telephoning

   Use such phrases as "Thank you" and "You're welcome." Courtesy on the telephone means courtesy in business dealings.

   Be attentive.

   Use the person's name.

6. When a call has been completed

   The originator of the call ordinarily ends the conversation.

   The courteous "Goodbye" is not mere window-dressing; it serves notice that the conversation is ended.

   The receiver should be hung up gently. Slamming the receiver may cause an unpleasant noise in the receiver of the other telephone and is as discourteous as slamming a door.

G. Telephone and Telegraph Services

1. Personnel shall not use telephones for long distance calls of a personal nature except in cases of emergency. Long-distance calls necessary to Institute operations must have prior approval of the supervisor in charge. A proper record must be kept of each long-distance call.
2. Maintenance employees at the Airport cannot normally be called to the telephone during regular working hours except in cases of emergency. They will be notified of all telephone calls and may return the call during the next rest period or the noon hour.
3. Write down every message taken for another and put it on his desk if he is absent. Never attempt to "remember" messages. Date every message and give the hour of the call. Write down the exact information given, not just part of it. Telephone numbers and names must be absolutely correct. If a message has been difficult to take, repeat it to the caller so he will know that it will be delivered correctly.
4. Telegrams may be called in to the Western Union Office. A copy of the message is kept for the file. Charges for personal telegrams will be billed by Western Union to the individual and can be paid at the Western Union Office.

H. Key Regulations

1. Campus — Keys for the campus office and Civil Engineering Hall are issued to personnel upon approval of the Director of the Institute of Aviation.
2. Airport
   a. Airport building and room keys are issued at the office of the supervising engineer.
   b. To obtain a key for any building or door an Airport Key Certificate will be prepared.
   c. A key or keys will originally be issued without charge to the department or individuals. Replacements for lost or misplaced keys shall be issued through the supervising engineer at a cost of 50 cents. Duplicate keys shall not be provided or made by any department or by any individual except the supervising engineer, field maintenance department.

I. Tips

1. No tips or extra payments shall be accepted by the personnel of the Institute of Aviation for work, help, or services rendered to the public or any other persons.

2. If work is performed for which there is a charge, it shall be handled through the operations office or the Bursar's Office. All other work or help rendered shall be considered a service courtesy of the Institute of Aviation.

J. Traffic Rules

1. Traffic rules in and about the Airport shall be those in general use within the scope of the State Highway Traffic Division and the rules and regulations of the University of Illinois.
2. No privately-owned vehicles shall be allowed on the runways, taxiways, landing areas, or ramp areas. Exceptions will be made when approved for convenience of the job or when the worker is using his own vehicle in lieu of field maintenance vehicles.

K. Regulations for Delivery and Pick-up Trips

1. The field maintenance department will send a vehicle and driver to the campus, Savoy, Champaign, and Urbana on Monday, Wednesday, and Friday. The departure time will be 1:00 p.m.
2. All requests for supplies, deliveries, errands, outgoing mail, and miscellaneous business transactions shall be delivered to the field maintenance office before 1:00 p.m. on Monday, Wednesday, and Friday. Large or heavy items will, for convenience, be picked up at the departmental office or at a location as indicated on the request form. All items indicated on request forms shall be official business of the department requesting. Any exceptions must be specifically approved by the department head.
3. A mail box is provided in the operations office and is marked "Outgoing Mail." This mail box is intended for use by the public and transients.
4. The bus driver will contact the operations office prior to the bus departure time of 1:40 p.m. for the purpose of providing currency exchange for Operations only. The field maintenance department will cooperate in providing other emergency pick-ups if notified prior to any bus departure time and provided time is available at the particular destination.

L. Regulations for Working on Landing Field Areas, Ramps, etc.

1. The operations office shall be properly notified when and where personnel or equipment are going to be working on the taxiways, runways, or landing strips.

2. All field maintenance vehicles or equipment used primarily on the landing area shall be painted yellow.
3. All field maintenance vehicles and equipment shall be flagged with the proper yellow and white flags before proceeding on any of the taxiways, runways, or landing areas.
4. All field maintenance vehicles and equipment shall be removed from the taxiways, runways, and landing areas each evening. Vehicles and equipment used on any runway, ramp, taxiway, or landing area after dark shall be equipped with headlights, tail lights, or proper spotlights so that they may be seen readily from the air.
5. All items or work performed on or in the above areas shall be completed and the area cleaned of excess material and equipment before leaving the work each evening. Any work not completed or any items of maintenance or construction which must remain shall be properly protected with lights, flares, flags, or other visible means of marking.

M. Off-Duty Work at the Department Location — Field maintenance personnel are not permitted to do any type of free lance work at the University of Illinois Airport.

N. Use of Department Facilities for Personal Projects

1. It is against the University policy to permit employees to use University shops, buildings, tools, machinery, or equipment for personal project work, even though the employee is not on duty at the time he desires the use of the shop, building, tools, machinery, or equipment.
2. University equipment cannot be checked out by employees and taken home or outside its normal location for personal use.

O. Use of Tools, Equipment, and Machinery

1. When taking out or removing a tool from its proper storage space, the individual worker assumes responsibility for the proper maintenance, handling, and return of the tool. The same applies to all equipment and machinery within the department.
2. It is the responsibility of the worker using equipment or machinery to see that the equipment or machinery is in proper running order. This includes checking gas, oil, water, and air in tires, etc.
3. Equipment, machinery, and vehicle check and report sheets

are available near the time clock for the purpose of reporting the condition and use of the equipment, vehicles, and machinery.

P. Use of Materials

1. Materials in stock or received by the field maintenance department shall be strictly accounted for by each individual workman as they are incorporated into the job. Each workman shall list on his daily work order the amount of material he uses.
2. All salvaged materials shall be placed in the field maintenance department storeroom and salvage yard. This material shall be re-used whenever possible. No material shall be used for the personal benefit of any field maintenance department employee.

Q. Care, Repair, and Maintenance of Tools, Equipment, and Machinery

1. The care, repair, and maintenance of hand tools shall, in general, be the duty of each individual in the department. Particular responsibility is to be placed on the individual using the tools.
2. The care, repair, and maintenance of equipment and machinery shall be the responsibility of the garage mechanics. Cooperation in reporting equipment and machinery repair needs shall be the responsibility of all field maintenance personnel.

III. Emergency Procedures

A. Crash — *Crash on the Airport:* Sound one long blast of the crash truck siren and render all possible assistance.

B. Fire

1. *Fire on the Ramp Area:* Man the nearest fire extinguisher immediately, and proceed to extinguish the fire. If assistance is needed sound one long blast of the siren on the crash truck. Linemen will be in charge of fire-fighting activity. Instructors and students will concern themselves with moving all other planes to a safe distance.
2. *Fire in the Hangar:* Sound one long blast on the siren. Man the nearest fire extinguisher and fight the fire. Students and instructors have been directed to move all planes out of the hangar immediately to a safe distance.

3. *Fire on the Airport Landing Area:* Man the crash truck immediately. Sound one long blast of siren. Proceed to the scene of the fire as quickly as possible.

C. Medical

1. Most apparent emergencies are not critical. If the injury involves only arms or hands, and injured employee is certain he can walk, he should be taken to the doctor.
2. The best qualified person should take command, then:
   a. Send for the doctor and give him your location and a few details of the emergency.
   b. Call the University police if transportation is required, and tell them whether the doctor has been called.
   c. Keep the patient warm.
3. Emergency procedures.
   a. Is patient breathing? If not, start artificial respiration.
   b. Is patient bleeding? If so, immediately place pressure with thumb and hand over bleeding point — use clean kerchief, paper towels, or toilet tissue if available. Tourniquet may be applied to mid-upper arm or mid-thigh.
   c. Is patient faint? If so, have him lie down; use floor if necessary; cover if possible.
   d. Is patient unconscious? If so, keep in a prone position with feet slightly elevated. Do not try to administer anything by mouth.
   e. If irritating fluid or gas has come in contact with eyes, face, or other parts of the body, flush area quickly with several pints of tap water and get patient to doctor immediately.
   f. In case of severe burns over a wide area or large-bone fracture, keep patient warm and wait for doctor or ambulance.
   g. In case of small wounds or burns, take patient to Health Service or hospital immediately; or, if not too severe, wash thoroughly with mild soap and warm water, pat dry with paper towel or toilet tissue, and apply own small dressing. Check with Health Service if in doubt at any time on the progress.
4. The field maintenance department has responsibility for the maintenance of safety supplies and kits.

D. Storm

1. *Approaching Storm:* Get all planes into the hangar immediately. Sound one long blast of the crash truck siren. Students and instructors have been instructed to assemble on the ramp for directions. Direct two men to a plane, and have them start pushing the planes into the hangar immediately. The linemen are in charge of this activity and may order any student or flight instructor to help in any way necessary.
2. *High winds:* Stand by to meet the planes landing and walk them into the hangar. If assistance is needed, sound the siren.

Appendix C — Field Maintenance Department Vehicles, Equipment, Tools, and Machinery

TYPE OF VEHICLE OR EQUIPMENT	NO. OF EACH	DEPT. OR PERSONNEL USING VEHICLE	ESTIMATE OF COST
Stationwagon	1	Linemen	$2100
Stationwagon	1	Field Maint.	$2100
Sedan (4-door)	1	All Depts.	$2500
Fire Truck (small chemical vehicle)	1	Linemen	$3000
Fire Truck (large) all-purpose chemical, water	1	All Depts.	$6000-20,000
Gas Porters ½-¾ T	2-3	Linemen	$2500-4000 (each)
Scooter	1	Linemen	$400-500
Tractor-Tug, rubber tires	1-3	All Depts.	$1500-1700-3000
Hi-Lift (approx. 4 T fork-type lift)	1	All Depts.	$4000-6000
Ambulance	1	Flight Dept. and Linemen	$3000-10,000 (varies depending on type and capacity)
Truck, ½ T pick-up	1-2	Field Maint.	$1600-1800
Truck, ¾ T pick-up with twin hoist and dumping bed	1	Field Maint.	$2300-2500
Truck, ½ T panel body	1	Field Maint.	$2000-2800
Truck, 2 T dump with flat bed or straight dumping bed	1	Field Maint.	$2500-3500
Truck 4 to 6 T 6 x 6 or heavy construction	1	Field Maint.	$3500-6000
Bus (40-60 passengers)	2	Field Maint.	$4500-6000
Tractors, rubber-tired, gasoline or diesel	2	Field Maint.	$1200-1800
Tractor with attachment for cutter bar	1-2	Field Maint.	$1500-2100
Mowers, Worthington 9 gang type	2 sets	Field Maint.	$1800-2200 per set
Tractor with scoop and tail end blade	1	Field Maint.	$1800-2000
Power Broom attachments for use on one of the above tractors	1 set	Field Maint.	$300-500
Road Patrol	1	Field Maint.	$5000+
Roller, tandem 5-8 T, or equivalent	1	Field Maint.	$5000
Mowers, one-man gasoline power type	3	Field Maint.	$100-400
Disc-Harrow	1	Field Maint.	$50-100
Spike-Tooth Harrow	1	Field Maint.	$25-50
Garden Tractor	1	Field Maint.	$300-500
Tractor Crane	1	Field Maint.	$10,000-15,000

Ditcher	1	Field Maint.	$5000-14,000
Trailer, multiple wheel air brakes. Min. 6 T, Max. 20 T	1	Field Maint.	$4000-10,000
Marking machine	1	Field Maint.	$1000
Air Compressor	1	Field Maint.	$1000-2000
Diesel generating unit	1-3	Field Maint.	$3000-10,000
Kettle, Heetmaster Double 120 gal. with 3 pots min.	1	Field Maint.	$1200
Tennant Grooving Machine, ½ HP motor complete	1	Field Maint.	$1200

Many additional tools and equipment are required or should be immediately available. This list is not complete but will indicate a few of the many items which are not included elsewhere:

1. drills ¼″ — ½″ electric
2. voltage tester
3. reamers
4. saws — table, skill, powered, and hand
5. bench grinders
6. welders — acetylene, arc-welders
7. bolt cutters
8. hammers
9. screw drivers
10. pliers
11. wrenches
12. motor tune-up sets
13. bench type lathes
14. chisels
15. sump, suction pumps, diaphragm
16. woodworking shaper
17. wood planer
18. extension ladders
19. step ladders
20. pipe threaders
21. drill presses
22. sanders
23. power hack saws
24. valve grinding equipment
25. mechanics flush guns
26. grease guns and greasers
27. wheelbarrows
28. battery chargers
29. automobile and equipment jacks and hoists
30. spray guns
31. blacksmith forge

32. vises
33. concrete mixer
34. carpenters levels
35. surveying equipment set — tape, chains, pins, poles, etc.
36. motor test set
37. metal working tools — cutters, benders, etc.
38. vacuum cleaners
39. push sweepers for large areas
40. weed spraying equipment
41. shovels, picks, axes, and tow chains

Among the supplies to be kept on hand are:

1. roofing materials and coating
2. runway paints
3. interior and exterior building paint
4. lumber
5. drainage tile
6. metal — galvanized, angles, plate, etc.
7. electrical items used in airport lighting plus necessary electrical materials for rewiring light and circuit installation within building
8. light bulbs
9. road surfacing material — rock, gravel, sand, etc.
10. landscaping material — grass seed, plants, trees, and nursery items
11. plumbing materials — small quantities for emergency repairs

APPENDIX D — FIELD MAINTENANCE FORMS AND THEIR USES

PERSONNEL RECORD — (FM-2)

A Personnel Record is kept on each employee. This form is placed in each employee's file and entries are made when needed.

UNIVERSITY OF ILLINOIS INSTITUTE OF AVIATION

PERSONNEL RECORD

Name_____ Phone No._____

Address_____

DATE	CLASSIFICATION	SALARY OR RATE

SICK LEAVE

DATE	LENGTH OF TIME

VACATION LEAVE

DATE	LENGTH OF TIME

WORK ORDER RECORD — (FM-3)

Work Orders (FM-4) are coded, sorted by date, numbered, and then listed on the Work Order Record (FM-3). This form is a complete record of all work done by the field maintenance department.

INSTITUTE OF AVIATION FIELD MAINTENANCE SECTION

WORK ORDER RECORDS

No.	Code	Date Issued	Date Completed	Work Year	Description of Work	Labor Cost	Material Cost	Total Cost	Remarks

WORK ORDER — (FM-4)

All work done by the field maintenance department is recorded on this Work Order form. Each person keeps a daily record of the work he performs. The information is used to compute payrolls and as a permanent record of the work done by this department. These sheets are collected weekly.

UNIVERSITY OF ILLINOIS INSTITUTE OF AVIATION

FIELD MAINTENANCE WORK ORDER

Date_____ Number & Code_____

Requested By_____ Assigned To_____

Work Requested_____

_____

TIME REQUIRED

Date	Hours	Name	Type Work	Rate	Descriptions, Comments

SUMMARY

Hours_____@_____ _____

_____@_____ _____

_____@_____ _____

Total Labor Cost _____

Total Material Cost _____

Total Cost of Job _____

MATERIALS OR EQUIPMENT USED ON JOB

Quan.	Item	Unit Cost	Total Cost

Total

RUNWAY INSPECTION RECORD — (FM-6)

A daily inspection as to the condition of the runways is made. A record of this information is made on the Runway Inspection Form. This information is especially helpful in checking field conditions for the airlines and for locating irregularities as soon as possible.

UNIVERSITY OF ILLINOIS INSTITUTE OF AVIATION

RUNWAY INSPECTION FORM

Date and Time	North – South 18 36	NW – SE 13 31	NE – SW 22 4	Signature of Inspector

DAILY EQUIPMENT SHEET — (FM-5)

Every time a piece of field maintenance equipment is used, a record is kept on a Daily Equipment Sheet as to the kind of work performed with it, the time spent using it, gasoline and oil used, mileage, and any maintenance work needed to keep the equipment in operating condition. These forms are collected weekly and the information on them is entered on monthly records. Records are kept on each piece of equipment and all vehicles. Special records are kept on the operation of the buses. These forms are filed as permanent records.

UNIVERSITY OF ILLINOIS INSTITUTE OF AVIATION

DAILY EQUIPMENT SHEET

Date_____ Vehicle Number_____

MILEAGE

Mileage at end of job or day _____

Mileage at beginning of job or day _____

Total Mileage for job or day _____

SERVICING

Gasoline From Airport Supply _____ gals.

Gasoline Purchased off the Airport _____ gals.

Oil _____ qts.

MAINTENANCE NEEDED

_____

_____

_____

Driver_____ Hours Worked_____

FIRE EXTINGUISHER RECORD — (FM-7)

This form is used by the field maintenance department for the periodic inspection of all fire extinguishers.

UNIVERSITY OF ILLINOIS INSTITUTE OF AVIATION

FIRE EXTINGUISHER RECORD

Date of Inspection	Serial or Inventory Number	Location	Type	Mfgr. Weight	Actual Weight	Condition	Tagged with Latest Insp. Date	Inspector's Name or Initials	Comments

MATERIAL PURCHASE AUTHORIZATION — (FM-8)

Whenever material needs to be picked up from local sources, the Material Purchase Authorization form is filled out, approved by the appropriate department head, and filed in the field maintenance office for action.

UNIVERSITY OF ILLINOIS INSTITUTE OF AVIATION

MATERIAL PURCHASE AUTHORIZATION

VENDOR_____

Please deliver the following material to_____

_____and charge to P.O._____

_____

_____

_____

Authorized by_____ Date_____ Dept._____
Name

REQUISITION RECORD — (FM-9)

A list is maintained for all requisitions made by the field maintenance department. As each requisition is written, a number and a description is entered on this form. When the purchase order and receiving report become available, the purchase order number and the name of the vendor are entered on the form. After the order has been received, the form is marked "complete." The final entry is made when the file copy of the invoice voucher, which shows the actual amount expended for the material, is received.

INSTITUTE OF AVIATION FIELD MAINTENANCE SECTION

REQUISITION RECORDS

Req. Number	Date Written	P.O. Number	Description	Vendor	Material Received	Delivery Status	Invoice Amount

GASOLINE PUMPED AT THE GARAGE — (FM-10)

This form is used to record the amount of gasoline drained from the gas porters which are kept at the garage.

Whenever a gas porter is returned to the lineman at the hangar, this sheet is turned over to him so that he may keep a record of the gasoline pumped. The gasoline used at the garage should check with the difference in meter readings which are recorded by the linemen.

UNIVERSITY OF ILLINOIS INSTITUTE OF AVIATION
FIELD MAINTENANCE SECTION

GASOLINE PUMPED AT GARAGE

Porter No._____ Meter Readings at End of Use_____

Beginning_____

Total Used_____

Date	Gallons	Piece of Equipment	By Whom

Total

INVENTORY RECORD CARD — (FM-11)

A card file is maintained for all Institute of Aviation equipment as a part of the master inventory record kept by the field maintenance office.

Numbers are assigned by the University Inventory Section when the equipment is purchased. The field maintenance office tags the equipment with appropriate numbers, then sends the Inventory Record card to the department in which the equipment is located.

INVENTORY RECORD

ITEM_____ INV. NO._____

LOCATION_____

P.O. NO._____ COST_____ DATE ACQUIRED_____

MARKED_____

TAGGED_____ DATE OF INVENTORY_____ CONDITION_____

REMARKS:

CHANGE OF EQUIPMENT INVENTORY — (FM-12)

This form is used to report any changes in the master inventory records of the Institute of Aviation.

UNIVERSITY OF ILLINOIS INSTITUTE OF AVIATION

REPORT OF CHANGES IN EQUIPMENT INVENTORY

To_____ Date_____

The following changes should be made in

the inventory records of the_____ Department.

Description of Equipment	Inventory Number	Cost or Value	Added or Removed	Method of Acquisition or Disposition*

* Methods of
Acquisition: Gifts, constructed, transferred, not previously inventoried
Disposition: Junked, transferred, lost, surplus, etc.

Reported by_____

STOCK INVENTORY CARD — (FM-13)

This Stock Inventory card is used by the field maintenance department to keep a record of stock material on hand.

STOCK INVENTORY

ITEM_____

Date	Quan. Rec'd.	Quan. Issued	Bal.	Price	Inv. No.	Comment

AIRPORT KEY CERTIFICATE — (FM-14)

This certificate is filled out for each key that is issued by the field maintenance department. The field maintenance department is responsible for the issuing of all keys to buildings and doors at the University Airport.

UNIVERSITY OF ILLINOIS INSTITUTE OF AVIATION

AIRPORT KEY CERTIFICATE

This is to certify that the duties of _____

_____ in _____ Department

render it necessary for h_____ to have a key to Room or Door No._____

of _____ Building at the Airport.

_____ 19__ _____

Head of Department

I agree to comply with the rules on building and room keys and agree to return keys issued to me.

_____

Signature

Key Issued (date)_____ by_____ Key Returned (date) _____ by_____

REFERENCES

The Superintendent of Documents, Government Printing Office, Washington 25, D. C., publishes a number of C.A.A. publications on airports. Among these are:

Airport Design, 30 cents
Airport Drainage, 30 cents
Airport Financial Statements, 15 cents
Airport Accounting, Budgeting, and Insurance, 15 cents
Airport Turfing, 25 cents
Airport Landscape Planting, 15 cents
Standard Specifications for Construction of Airports, $2.00

Among the books which contain helpful information on airports are the following:

Frederick, John H., *Airport Management,* Chicago: R. D. Irwin, Inc., 1949.
Froesch, Charles, and Prokosch, Walter, *Airport Planning,* New York: John Wiley & Sons, 1946.
Glidden, Horace K., Law, Hervey F., and Cowles, John E., *Airports,* New York: McGraw-Hill, 1946.
Wilson, G. Lloyd, and Bryan, Leslie A., *Air Transportation,* New York: Prentice-Hall, 1949.

THE INSTITUTE OF AVIATION, established in 1945 as the Institute of Aeronautics, is operated as the administrative agency responsible for the fostering and correlation of the educational and research activities related to aviation in all parts of the University. Other functions include academic instruction, flight training, management of the University of Illinois Airport, and aeronautical research.

In connection with the latter function, the Institute issues two types of publications . . . first, a group of reports on research results, and second, a series of bulletins on aviation subjects of an extension-service nature to the citizens of the State.

The following publications have been issued:

BULLETIN ONE: Municipal Airport Management, Leslie A. Bryan, 1947. (Out of print)

BULLETIN TWO: Landscape Planting for Airports, Florence B. Robinson, 1948.

BULLETIN THREE: Labor Relations in the Air Transport Industry Under the Amended Railway Labor Act, E. B. McNatt, 1948.

BULLETIN FOUR: Airport Zoning, J. Nelson Young, 1948. (Out of print)

BULLETIN FIVE: Evaluation of the School Link as an Aid in Primary Flight Instruction, A. C. Williams, Jr. and Ralph E. Flexman, 1949.

BULLETIN SIX: Lightplane Tires on Turf and Concrete, Leslie A. Bryan, 1949.

BULLETIN SEVEN: Light Aircraft Operating Costs, Leslie A. Bryan, 1949.

BULLETIN EIGHT: Evaluation of the School Link and Special Methods of Instruction in a Ten-Hour Private Pilot Flight-Training Program, Ralph E. Flexman, William G. Matheny, and Edward L. Brown, 1950. (Out of print)

BULLETIN NINE: Flight by Periscope: I. Performing an Instrument Flight Pattern; the Influence of Screen Size and Image Magnification, Stanley N. Roscoe, 1951.

BULLETIN TEN: Operating Costs of a Light Aircraft Fleet, Leslie A. Bryan, 1952.

BULLETIN ELEVEN: 180-Degree Turn Experiment, Leslie A. Bryan, Jesse W. Stonecipher, and Karl Aron, 1954.

BULLETIN TWELVE: Aviation Ground School, Leslie A. Bryan, 1954.

BULLETIN THIRTEEN: Organizing for Flight Operations, Leslie A. Bryan, 1954.

BULLETIN FOURTEEN: Developing an Aircraft Maintenance Curriculum, Leslie A. Bryan, 1955.

BULLETIN FIFTEEN: Airport Shop Operations, Leslie A. Bryan, 1955.

BULLETIN SIXTEEN: College and University Airport Management, Leslie A. Bryan, 1955.

PUBLICATIONS OF THE INSTITUTE OF AVIATION WILL BE SENT FREE OF CHARGE UPON REQUEST

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